Review Comments
Shore Terminals Source Control Evaluation
9420 NW St. Helens Road
Portland, Oregon
Site Number 5130
Dated March 2015

Submitted June 24, 2015

Following are the United States Environmental Protection Agency's (EPA) comments on the document entitled, Source Control Evaluation Report Shore Terminals LLC, Portland Facility (SCE), dated March 16, 2015 and prepared by Apex for Shore Terminals LLC. The site is located at 9420 NW St. Helens Road, Portland, Oregon, listed as State of Oregon, Environmental Cleanup Site Information (ECSI) number 5130. The site is located at approximate River Mile 5.4 west (RM 5.4W). EPA understands the objectives of the SCE were to:

- Identify potential sources to the Willamette River;
- Evaluate the potential sources to present unacceptable risk to sediment and water quality in the Willamette River;
- Present a SCE for the stormwater, groundwater, and riverbank erosion pathways; and
- If necessary, recommend source control measures (SCMs).

EPA's review and subsequent comments are focused on the March 16, 2015 SCE report. Notably there were other documents referenced in the report that, if available, could provide additional background information that may revise our comments below.

General Comments

1. The Site Location Map in Figure 1 does not included the portion of the site inland of the railroad tracks. The site indicator on Figure 1 should be expanded to include the entire site so that it matches the site property boundary shown in Figure 2 and described in the report. The summary of Portland Harbor Remedial Investigation sediment data does not include sediment data collected offshore of the Southern Facility Area. These data are needed to evaluate contaminant transport from the Southern Facility Area to the river and should be included in the SCE.

2. The comparison of site stormwater discharge concentrations to Gasco groundwater treatment system permitted discharge limits is not an appropriate line of evidence for evaluating risk related to stormwater discharges to the Willamette River. The discharge limits for the Gasco system were developed specifically for the site conditions and treatment system at Gasco. For

example, treated groundwater from the Gasco system discharges through an offshore underwater diffuser, which mixes the discharge with surface water over a larger area. At Shore Terminals, stormwater discharge at a single discharge point on the bank, which necessitates more stringent discharge limits to protect the river. The appropriate comparison criteria that should be used to evaluate stormwater and stormwater solid samples in the stormwater SCE are the water Preliminary Remediation Goals (PRGs) that EPA has established for the Portland Harbor site for remedial action objectives (RAOs) 3, 4, 7, and 8.

3. EPA does not agree with the SCE conclusion that concentrations of polycyclic aromatic hydrocarbons (PAHs) in stormwater discharging at Outfalls WP-78, WP-152, and WP-209 do not pose unacceptable risk to the Willamette River. Further evaluation is needed based upon the following observations:

   At Outfall WP-78, concentrations of carcinogenic PAHs (cPAHs) in stormwater ranged from 0.013 to 0.082 micrograms per liter (µg/L), exceeding the PRG of 0.0013 µg/L. PAH concentrations in stormwater and storm system solids should also be compared to the DEQ Industrial Stormwater Curves. Concentrations of cPAHs in stormwater solids samples also exceed the PRG. Sediment data collected off shore of Outfall WP-78 indicates that PAHs from the site may be accumulating in sediment of the Willamette River at concentrations exceeding the PRG. For example, sediment samples G-166, G170 and WR-SD-43 off shore of WP-78 have 817, 110, and 208 µg/kg cPAHs, respectively. These concentrations exceed the BAPeq PRG of 106 µg/kg for sediment direct contact. In addition, the PAH concentrations in sediment sample G-219 exceed the PRGs for both total PAH and BAPeq. The relative contribution of PAHs to off shore sediment from WP-78 stormwater discharges and from upstream sources (e.g. Gasco) is not known; therefore, PAH concentrations in stormwater discharging at WP-78 should be reduced to the maximum extent feasible.

   At Outfall WP-152, concentrations of cPAHs in stormwater ranged from 0.004 to 0.012 µg/kg, exceeding the PRG. The closest sediment sample to Outfall WP-152 is G191, which had total cPAHs detected at 373 µg/kg, exceeding the BAPeq PRG of 106 µg/kg.

   At Outfall WP-209, concentrations of cPAHs in stormwater ranged from 0.002 to 0.021 µg/L. PAH concentrations in stormwater should also be compared to the DEQ Industrial Stormwater Curves. Sediment samples G-184 and G-185, located off shore of Outfall WP-209, had cPAHs detected at 122 µg/kg and 542 µg/kg, respectively, greater than the BAPeq PRG of 106 µg/kg.

   Based on the exceedances of the PRG in stormwater discharging at WP-78 and WP-152 and in sediment off shore of each of these outfalls, PAHs should continue to be monitored as part of the NPDES 1200Z monitoring. In addition, additional BMPs implemented as needed to reduce PAHs in stormwater. EPA understands that ODOT is monitoring WP-209 as part of the SCE for their stormwater discharges to the river.

4. The dissolved contaminant plume originating at the Fuel Loading Rack Area requires further monitoring to demonstrate that it is stable and not migrating downgradient to the river. Potential issues related to plume migration are as follows:

a. **Petroleum Hydrocarbons** – The concentration trend plots in Appendix Q indicates increasing concentration of TPHg and benzene at monitoring well MW39. Between September 2012 and September 2014, TPHg concentrations at MW39 increased from 23 to 55 mg/L and benzene concentrations increased from 17,000 to 33,000 µg/L. At Deep Sand monitoring well MW44, located approximately 280 feet downgradient of the loading rack, TPHg concentrations increased from 7 to 8.9 mg/L and benzene concentrations increased from 2,800 to 3,500 µg/L, between September 2012 and September 2014. The increasing concentration trends at these wells indicate migration of dissolved phase contaminants downgradient from the Fuel Loading Rack source.

b. **Arsenic –** Elevated concentrations of arsenic are present in groundwater at the Fuel Loading Rack Area wells KMW13, KMW14, MW43, MW38, and MW39. Arsenic concentrations are up to 59.1 µg/L, exceeding the PRG for arsenic of 2.1 µg/L. A review of the arsenic concentration shown in Figure 16 indicates that the wells with high arsenic concentrations exceeding the PRG are associated with the dissolved TPH-g/benzene plume at the Fuel Loading Rack Area. At areas where petroleum hydrocarbons are not present in groundwater, arsenic concentrations are nondetect (<1 µg/L). The increasing arsenic trends observed at MW39 and MW44, downgradient of the Fuel Loading Rack Area, indicate that downgradient migration of arsenic impacted groundwater is occurring.

c. Groundwater monitoring should continue to be performed downgradient of the Fuel Loading Rack Area to evaluate downgradient migration of the dissolved phase plume and optimize operation of the air sparging/soil vapor extraction and groundwater extraction system. Wells to be monitoring should include MW43, MW38, MW39, MW44, MW41A, MW41B, and KMW17. Monitoring results can be used to determine if the plume is migrating towards the river and to make decisions on whether or not reactivation of the groundwater extraction and treatment system is needed.

5. With the exception of the wells shown on cross section A-A' in Figure 3, no information on well screen intervals is included in the SCE report. Well screen intervals are needed to evaluate the chemical and hydraulic data in the SCE. A table with well construction dimensions, and text describing general well construction, should be added to the report.

6. Rebound of contaminant concentrations in groundwater following shutdown of the groundwater treatment system has the potential to release contaminated groundwater to the Willamette River. EPA recommends that post-shutdown groundwater monitoring be increased from semi-annually to quarterly for the following reasons:

   a. Quarterly monitoring will provide early detection of high contaminant concentrations in groundwater and will allow for timely decision making to restart the treatment system, if needed.

   b. Quarterly monitoring will provide data needed to evaluate seasonal changes and contaminant concentrations at high and low groundwater levels.

c. Quarterly monitoring will provide more data over a shorter time frame to determine if contaminant concentrations have stabilized to levels established in the Record of Decision (ROD) for the Exxon Mobil site (now part of the Shore Terminals site) and are below the Portland Harbor PRGs.

If monitoring results indicate increasing trends and concentrations significantly above the PRGs, then the groundwater treatment system should be restarted. EPA recommends a minimum of four quarterly post-shutdown monitoring events to evaluate post-shutdown conditions. Once stable concentrations are documented, the frequency of monitoring could be reduced

Specific Comments

1. Section 2.3, Page 5 – The discussion of hydrogeology should discuss tidal effects and how they affect groundwater elevation and gradient at the site.

2. Section 2.5.1, Page 7 – The types of chemicals stored or used at the Hazardous and Non-Hazardous Waste Storage Area and the shops at Building 5, Building 12, Building 15, Building 16, and Building 17 should be described.

3. Section 3.3.1, Page 3.1.2, Page 17 – The concentrations detected in the riverbank soil were below concentrations capable of producing a sheen; however, a sheen was observed in the river from 2006 – 2008, indicating that the source of the sheen was not identified by the sampling efforts. Because the source of the sheen has not been identified, EPA recommends visual monitoring at this location for surface water sheen during future stormwater and groundwater monitoring events.

4. Section 5.6.5.1, Page 31, last paragraph – From the hydrographs included in Appendix J, it is not clear when runoff started at the sampling point. Each hydrograph should be annotated with the start of runoff

5. Section 5.6.5.3, Page 32, second paragraph – Per JSCS guidance, if a laboratory method cannot meet the JSCS screening level, then an alternative analytical method with lower method detection limits should be used if it is currently available.

6. Section 6.6.1, Page 43, first paragraph – Impacts to groundwater due to the release at the Loading Rack area have not been mitigated and concentrations exceed the cleanup goals established in the Exxon Mobil ROD and the Portland Harbor PRGs. Further monitoring and evaluation are needed, as described in General Comment 7.

7. Section 6.1.1, page 43, second paragraph – The location of the 1960s, and 1970s petroleum sheen should be indicated on Figure 4.

8. Section 6.1.1, Page 43, second paragraph – The construction details of the slurry wall, including total depth, thickness, and material should be provided.

9. Section 6.1.2, Page 47, third paragraph, fourth bullet – Monitoring wells MW-43 and MW-39 indicated increasing concentration trends for TPHg, benzene, and the downgradient extent indicating that the plume is not stable.

10. Section 6.1.3, Page 48, first paragraph – The depth intervals for well screens and sparging treatment intervals should be provided.

11. Section 6.1.4.4, Page 53, second bullet – The current PRG for arsenic is 2.1 µg/L.

12. Table 3 – The presentation of the organochlorine pesticide results is confusing and should be clarified. The MDLs for the EPA Method 8081 with low MDLs and the results by EPA Method 8081 appear to have the same MDLs. The SLV exceedances for total DDx are gray shaded in the EPA Method 8081 results, but not gray shaded in the EPA Method 8081 results. Also a value of 0.297 for 4,4'-DDT is shaded even though it does not exceed the SLV of 0.33. The PRG for total DDx in sediment should be updated to 6.1 µg/kg.

13. Figures 12, 13, 14, 15, 16, 21, and 22 should specify the date of the sample results or groundwater elevation measurements.

14. Appendix J – The secondary y-axis for some of the hydrographs are not labeled.